

REMARKS

In view of the above amendments and following remarks, reconsideration and further examination are requested.

By the current Amendment, claim 27 has been amended to recite that the first semiconductor is sealed by resin, and that the leading ends of the pillared electrodes extend to a uniform height relative to one another.

It is respectfully submitted that claim 27, both before and subsequent to the instant amendment thereto, and claims 57 and 59 are not taught or suggested by any combination of the references relied upon by the Examiner for reasons to follow.

Initially, each of claim 27 (prior to the instant amendment), claim 57 and claim 59 recites
a heat radiating plate having a surface to which is joined said
lower face electrode via solder or conductive paste.

Such a limitation is not taught or suggested by any combination of references relied upon by the Examiner.

With regard to this limitation, the Examiner has taken the position that it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Takahashi et al. as depicted in Figures 1B and 2C by incorporating a conductive paste to bond together the semiconductor element 12 and the heat dissipation plate 16 in view of the teachings of Juskey et al. This position is respectfully traversed for the following reasons.

In Figure 1B of Takahashi et al., semiconductor element 12 is mounted on bed 11a of leads 11 via solder 13. Heat dissipation plate 16 is spaced from the bed 11a by portions of an insulated molded body 15. Accordingly, in order to modify the semiconductor device as shown in Figure 1B of Takahashi et al. as proposed by the Examiner, a conductive paste would have to be substituted for at least some portions of the molded body 15, and this conductive paste would have to be connected to the bed 11a.

It is respectfully submitted that there would have been no motivation or suggestion to have modified the device of Figure 1B in such a manner. It is appreciated that Juskey et al. discloses a chip 64 joined to a heat sink 20 via conductive paste 66. However, because of the different constructions

of the semiconductor package of Juskey et al. and the semiconductor device of Takahashi et al., it is respectfully submitted that one having ordinary skill in the art would not have been motivated to combine the teachings of these references. Indeed, to modify Takahashi et al. in such a manner would completely change the device of Fig. 1B by having semiconductor element 12 of Fig. 1B be electrically connected to the heat dissipation plate 16, rather than being electrically isolated therefrom as shown in Fig. 1B. There is no reason to believe that one having ordinary skill in the art would have sought such a substantial alteration of the device shown in Fig. 1B, or that the device as shown in Fig. 1B would operate as intended were element 12 electrically connected to plate 16.

Similarly, with regard to the semiconductor device as depicted in Figure 2C of Takahashi et al., in order to make the substitution as proposed by the Examiner, a conductive paste would have to be substituted for at least part of copper layer 30, ceramic substrate 21 and circuit pattern 22 such that the semiconductor element 12 could be joined to the heat dissipation plate 16 via the conductive paste. For reasons analogous to those expressed above with regard to the device shown in Fig. 1B, it is respectfully submitted that there would have been no motivation or suggestion to substantially alter the semiconductor device as depicted in Figure 2C in such a manner,

Hikita et al., Sakai et al. and Kondoh et al. do not resolve the above deficiencies of Takahashi et al. and Juskey et al., and accordingly, for this reason alone claim 27 (prior to the instant amendment), and claims 57 and 59 are allowable.

Additionally, each of independent claims 27, 57 and 59 require that the pillared electrodes extend to the same level. In this regard, claim 27 recites

said leading ends of said pillared electrodes extending to
a uniform height relative to one another.

Similarly, each of claims 57 and 59 recite

said leading ends of said pillared electrodes...are
substantially equally spaced relative to one another
from said surface of said heat radiating plate.

Neither of these limitations is taught or suggested by any of the references relied upon by the Examiner.

In order to address these limitations, the Examiner relied upon a combination of Takahashi et al. and Hikita et al. The Examiner has equated electrodes 16b in Hikita et al. and pin electrodes 29 of Takahashi et al. to pillared electrodes. Assuming that one would have found it obvious to provide electrodes like 16b of Hikita et al. on the semiconductor element 12 as depicted in Figure 2C of Takahashi et al., as proposed by the Examiner, then there is no reason to believe that these electrodes would extend to the same level as do terminals 29. This deficiency is also not remedied by any of the other references relied upon by the Examiner, and accordingly, for this additional reason, each of claims 27, 57 and 59 is allowable.

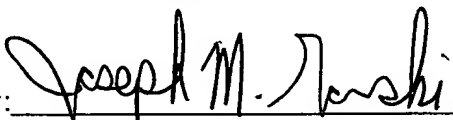
If the Examiner continues to reject claims 27, 57 and 59, then the Examiner is respectfully requested to specifically explain the rationale supporting the position that electrodes provided on semiconductor element 12 of Takahashi et al., in view of Hikita et al., would extend to the same level as do the pin electrodes 29 of Takahashi et al.

In view of the above amendments and remarks, it is respectfully submitted that the present application is in condition for allowance and an early Notice of Allowance is earnestly solicited.

If after reviewing this Amendment, the Examiner believes that any issues remain which must be resolved before the application can be passed to issue, the Examiner is invited to contact the Applicants' undersigned representative by telephone to resolve such issues.

Respectfully submitted,

Kazuhiro NOBORI et al.

By: 

Joseph M. Gorski
Registration No. 46,500
Attorney for Applicants

JMG/edg
Washington, D.C. 20006-1021
Telephone (202) 721-8200
Facsimile (202) 721-8250
October 27, 2003